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Helicobacter pylori Antimicrobial Resistance and Treatment for Alaska Native People

Background

Helicobacter pylori bacterial infection predisposes individuals to gastric and duodenal ulcers, chronic active gastritis, mucosal-associated lymphoid tissue (MALT) lymphoma, and gastric adenocarcinoma.¹ Infection usually occurs during childhood, presumably by direct person-to-person transmission, more commonly in crowded household settings.¹ With a seroprevalence of 75% (range: 61–84%, by region), Alaska Native people experience higher rates of *H. pylori* infection and stomach cancer than non-Native Alaskans.^{2,3} Antimicrobial resistance is more common in *H. pylori* isolates from Alaska Native people than in other U.S. populations,⁴ and contributes to relatively high treatment failure rates (26% in one study).⁵ Understanding antimicrobial resistance patterns can guide therapy and increase *H. pylori* treatment success in Alaska Native patients.

Methods

The Arctic Investigations Program (AIP), Centers for Disease Control and Prevention (CDC) *H. pylori* Sentinel Surveillance System cultures *H. pylori* from endoscopic biopsy tissue submitted from five hospitals that provide care to Alaska Native people across five regions of Alaska. The AIP laboratory conducts minimum inhibitory concentration testing of isolates for antibiotics commonly used to treat *H. pylori* infection (i.e., metronidazole, clarithromycin, levofloxacin, amoxicillin, and tetracycline).⁴

Results

Of the 1,256 Alaska Native stomach biopsy samples received from January 2000 through December 2009, 45.1% (566/1,256) were culture-positive for *H. pylori*. Among patients with *H. pylori*-positive cultures, the proportions of isolates demonstrating resistance to metronidazole, clarithromycin, levofloxacin, and amoxicillin were 41.7% (235/564), 29.3% (165/564), 19.7% (37/188) and 1.8% (10/564), respectively. We found no tetracycline-resistant isolates or statistically significant trends in antimicrobial resistance over time. Levofloxacin resistance was more common in patients living in Anchorage/Mat-Su than other regions (29.1% vs. 15.8%, $P=0.04$; Table). Clarithromycin and metronidazole resistance were more frequent in females than males (36.4% vs. 22.6%, $P=0.003$ and 52.2% vs. 31.9%, $P<0.001$, respectively).

Discussion

Antimicrobial resistance is common among *H. pylori* isolates cultured from Alaska Native patients. Although surveillance has shown that metronidazole resistance is common, treatment failure occurred more often in patients with clarithromycin-resistant isolates who received clarithromycin-based regimens (10/13) than patients with metronidazole-resistant isolates who received metronidazole-based regimens (2/18).⁵ When treating an Alaska Native patient for *H. pylori* infection, a metronidazole-based regimen should be first line therapy. The

high prevalence of infection, reinfection, and treatment failure of *H. pylori* in Alaska Native people warrants *H. pylori* screening and treatment guidelines specific to this population (Box).

Box. *H. pylori* Screening and Treatment Guidelines for Alaska Native Patients

- Test and treat *H. pylori* infection in persons with: 1) duodenal or gastric ulcers;⁶ 2) MALT lymphoma; 3) severe gastritis (not NSAID or alcohol-related), especially in those patients with unexplained anemia.
- Do **not** test for *H. pylori* in routine dyspepsia evaluations because most patients will have positive serologic results regardless of their symptoms.
- Treat *H. pylori* infection with an FDA-approved regimen accounting for local antimicrobial resistance patterns. In Alaska Native patients, metronidazole-based quadruple therapy regimens (usually containing tetracycline, bismuth, and a proton pump inhibitor [PPI]) have shown superior cure rates.⁵
- Test individuals treated for *H. pylori* infection 2 months after completion of therapy.
- Consider other therapies (e.g., PPI, H2 blockers, or prokinetic drugs) instead of *H. pylori* treatment in people with: 1) dyspepsia without anemia; 2) mild to moderate gastritis, esophagitis, or clear reflux symptoms; 3) poor gastric motility.

(Abbreviations: NSAID=nonsteroidal anti-inflammatory drug; FDA=Food and Drug Administration)

Recommendations

1. Providers should follow the *H. pylori* screening and treatment guidelines for Alaska Native patients (Box).
2. Test for *H. pylori* cure with urea breath, fecal antigen, or endoscopic tests 2 months after completion of therapy.
3. If at a participating hospital, send endoscopic gastric biopsy specimens to the AIP laboratory for *H. pylori* and antimicrobial resistance surveillance.

References

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Table. Regional *H. pylori* Prevalence and Antimicrobial Susceptibility among Alaska Native Persons (N=1,256), 2000–2009

| Tribal Health Region of Residence | % <i>H. pylori</i> Culture Positive | % Metronidazole (Met) Resistant | % Clarithromycin (Clar) Resistant | % Amoxicillin Resistant | % Met and Clar Resistant | % Levofloxacin Resistant |
|-----------------------------------|-------------------------------------|---------------------------------|-----------------------------------|-------------------------|--------------------------|--------------------------|
| Anchorage/Mat-Su | 39% (178/458) | 40% (72/178) | 30% (53/178) | 1% (2/178) | 15% (27/178) | 29% (16/55) |
| Yukon-Kuskokwim | 59% (175/298) | 43% (76/175) | 29% (51/175) | 2% (4/175) | 13% (23/175) | 11% (2/19) |
| Bristol Bay | 42% (104/248) | 38% (39/103) | 26% (27/103) | 0% (0/103) | 16% (16/103) | 15% (13/84) |
| Norton Sound | 49% (54/111) | 41% (22/54) | 35% (19/54) | 5% (3/54) | 26% (14/54) | 50% (3/6) |
| Northwest Arctic | 40% (25/62) | 45% (11/24) | 42% (10/24) | 4% (1/24) | 25% (6/24) | 17% (2/12) |
| Other | 38% (30/79) | 50% (15/30) | 17% (5/30) | 0% (0/30) | 7% (2/30) | 8% (1/12) |
| TOTAL | 566/1,256 | 235/564 | 165/564 | 10/564 | 88/564 | 37/188 |